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THE DEVELOPMENT OF CHEMIST WEB INSTRUCTIONAL MEDIA ON SALT HYDROLYSIS MATTER

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Abstract

The aims of this study to know the feasibility of Chemist web instructional media on salt hydrolysis matter. This study that used the Research and Development (R&D) includes potential and problems, collecting data, product design, validation, and test of product. Limited test on 15 students in class XI IPA I at Public Senior High School 2 Lamongan. The results showed that Chemist web instructional media has been developed is feasible for use in learning process based on the average results from third validator about construct and content feasibility with the percentage of each criteria, respectively for 85,33% and 82,96%. Also based on the aspect legibility or empirical validity with the percentage and it supported by the results of student's responses indicate that Chemist web instructional media that has been developed receive positive response with the average percentage is 99,51%. It is supported by the results of student learning outcomes increased with n-gain is 0,67 with 93,33% classical thoroughness.
Keywords: *Chemist web instructional media, salt hydrolysis, feasibility media*

Abstrak

Penelitian ini bertujuan untuk mengetahui kelayakan media pembelajaran *Chemist web* yang dikembangkan sebagai media pembelajaran pada materi hidrolisis garam. Penelitian ini menggunakan metode *Research and Development* (R&D) meliputi potensi dan masalah, pengumpulan data, desain produk, validasi desain, dan ujicoba produk. Ujicoba produk dilakukan pada 15 siswa kelas XI IPA 1 di SMA Negeri 2 Lamongan. Hasil penelitian menunjukkan bahwa media pembelajaran *Chemist web* yang dikembangkan telah layak digunakan dalam proses pembelajaran berdasarkan rata-rata hasil validasi dari ketiga validator terhadap setiap kriteria kelayakan konstruksi dan kelayakan isi dengan persentase masing-masing kriteria berturut-turut sebesar 85,33% dan 82,96%. Selain itu berdasarkan aspek keterbacaan atau validitas empiris dengan persentase sebesar 99,51% dan didukung hasil respon siswa menunjukkan bahwa media pembelajaran *Chemist web* yang dikembangkan mendapat respon positif dengan persentase rata-rata hasil angket respon siswa sebesar 89,33% dan didukung dengan hasil belajar siswa yang mengalami peningkatan *n- gain* sebesar 0,67 dengan ketuntasan klasikal sebesar 93,33%.
Kata kunci : Media pembelajaran *Chemist web*, hidrolisis garam, kelayakan media

INTRODUCTION

Quality of human resources is the main goal of education in Indonesia. Education is inseparable from the learning process that includes teachers, students, and other components that influence each other in order to achieve the learning objectives.

Chemistry learning in the school is expected to make the students interested to learn, to feel happy and more active in teaching and learning process, as well as students can reach maximum learning outcomes. But in reality, students sometimes feel bored and tired, more than 60% of students still cannot be active in the learning process [1] and student learning outcomes is low [2]. To solve these problems, it is necessary to find a media that can provide ease and sense of fun to the students to learn chemistry.

Based on the results of questionnaire that given to the 28 students at SMAN 2 Lamongan. 35.71% of students stated that the salt hydrolysis difficult matter. While

students expressed the buffer matter is hard at 7.14%, 3.57% for acid-base matter, 7.14% colloid matter, 14, 29% of the matter and the remaining 28.57% Ksp for matter reaction rate. The difficulties experienced by students in the matter is influenced by understanding of previous matter is about acid-base solutions and acid-base titrations matter are still less [2]. Lack of use of instructional media on the chemistry lesson, the students have difficulties in understanding and mastering the concept of Chemistry, particularly salt hydrolysis [3].

Internet usage in Indonesia, tended to increase from year to year. According to the Indonesian Internet Service Providers Association (Asosiasi Penyelenggara Jasa Internet Indonesia/APJII) increased Internet usage. The year 2012 recorded the number of Internet users reached 63 million. Whereas in 2013, according to projections of APJIII will reach 82 million users, projections of APJIII in 2014 Internet users will reached 107 million users [4]. The use of technology as an instructional media to improve the quality of learning is needed to maximize the learning process. One form of internet use in learning is by utilizing media websites or web-based learning or Web-Based Education (WBE). Students expressed happier when accessing information related to the subject matter by using internet services [5].

Based on the questionnaire, as much as 100% of students are able to access the internet. However, only 42.85% of students who access the internet for learning resources. The other are used to play games, social networking, as well as for entertainment. And as much as 57.14% of students agree that learning chemistry using web.

Teaching at chemistry, there is abstract concept, for example concepts in salt hydrolysis matter and very difficult to visualize the verbal form, so it requires the ability of teachers to organize learning process that can stimulate student to build their knowledge. Therefore, it is necessary instructional media in which there are visualization to explain the salt hydrolysis matter is by using a web-based learning. Due to the use of web-based learning students can learn or can review course matter at anytime and anywhere if necessary, changing the role of passive learners into active and more independent, but it is relatively efficient.

Pleasure in learning is the key to success in mastering the lesson as a whole and well [2]. Fun learning is to evoke senses of student's curiosity to develop audio-visuals effects so that students do not undergo misperceptions [6].

To make interesting website, we need a form of dynamic sites, where the data is displayed change according to the manufacturer wishes or needs of the user [7].

The aims of this study to know the feasibility of Chemist web instructional media developed as a learning media to the salt hydrolysis matter.

METHOD

In this study, researchers developed an Chemist web instructional media at salt hydrolysis matter. The development research, refers to the Research and Development (R & D) [8]. In this study are limited to testing the product.

The sample is 15 student of Public Senior High School 2 Lamongan, who has obtained the salt hydrolysis matter.

This research procedure using R&D modified includes the potential and problems, collecting data, design product, design validation, and limit testing. Research procedure using the R&D modified can be described as follows:

1. *Potential and problems*

   The problems in the learning process are: (a) students sometimes feel tired and bored and more than 60% of students are still less active in teaching and learning process [1]; (b) student learning outcomes is low [2]; (c) use of the internet as a learning resource for students is still low

   Potential to solve the problem is use of computer media can help students in a store, absorb and apply

the lessons learned in solving problems [9].

Based on the information of the potential and problems, it can be concluded that learning requires the web-based instructional media to improve spirit and student understanding.

2. *Collecting data*

Collected a variety of information that can be used as matter for planning web.

3. *Design product*

a. Web Design

Conducted by making the initial design of web media, including: a) Determine outline media; b) Collecting matters; c) Combine all the source

Here is a picture about one of the menu in Chemist web instructional media:

Figure 1. Menu objectives in Chemist web instructional media

b. Review

After Chemist web instructional media created, the media is conducted to obtain suggestion from the experts.

c. Revision

After Chemist web instructional media examined, the next step is to revise the design.

4. *Design validation*

After Chemist web instructional media is revised, the media ready to be validated by one chemistry lecturer and two chemistry teachers. Validation of media aims to provide an assessment based on construct and content feasibility

5. *Limit testing*

After Chemist web instructional media is feasible, the next step is doing the limited testing with 15 students of class XI Science 1 in Public Senior High School 2 Lamongan. After students finish testing Chemist web instructional media, students were asked to fill out the questionnaire responses. From these results, we can determine the response of students to Chemist web instructional media.

The instrument used by researcher to obtained data includes review media sheet, validation media sheet, observation of student activities sheets, and student response sheets.

The method used by researcher to collect data includes questionnaire and observation methods.

Media analysis techniques used for the validation of Chemist web instructional media obtained by calculation using a Likert scale as follows [10]:

Table 1. Scale of Likert Score

Score	Assessment
5	very good
4	good
3	medium
2	bad
1	very bad
0	none

Student responses obtained by calculation using the Guttman scale as follows [10]:

Table 2. Scale of Guttman Score

Assessment	Score
Yes	1
No	0

From both these scales, to obtain the percentage of feasibility using the following formula:

$$P(\%) = \frac{\text{sum of collected data score}}{\text{criteria score}} \text{x } 100\%$$

$$\textit{criteria score} = \text{highest score } x \sum \textit{aspect in criteria } x \sum \textit{validator}$$

From the calculation, it can be interpreted as follows [10]:

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Table 3. Score Interpretation

Percentage	Category
0% - 20%	very bad
21%-40%	Bad
41%-65%	medium
66%-80%	good
81%-100%	very good

Based on these criteria, the Chemist web instructional media is feasible if the percentage is ≥ 61%.

To determine student learning outcomes using test gain as follows:

$$(g) = \frac{(posttest\ score) - (pretest\ score)}{maximum\ score - (pretest\ score)}$$

The gain value has been obtained can be interpreted to the following criteria [11]:

Table 4. Gain Interpretation

Score	Assesment
g<0,30	low
0,30≤g≤0,70	medium
g>0,70	high

RESULTS AND DISCUSSION

Before the media is tested, the questions that used should be examined by a chemistry lecturer to determine the feasibility of the questions. The amount of questions that is composed by 25 questions which are divided into 4 indicators. Questions that used in Chemist web instructional media is multiple choice with 5 alternative choices.

After the questions are revised, Chemist web instructional media ready for review by 3 validator. Review media aims to provide suggestions about quality of Chemist web instructional media in terms of construct and content feasibility.

Chemist web instructional media revised in accordance with the suggestion given by reviewer. After Chemist web instructional media revised, validated by one chemistry lecturer and two chemistry teachers.

Table 5. Results of Feasibility Chemist web instructional media

No	Feasibility criteria	Percentage (%)	Category
1.	Construct feasibility	85,33	Very good
2.	Content feasibility	82,96	Very good
3.	Empiric feasibility	99,51	Very good
Feasibility media average		89,27	Very good

Based on the validation results of the media as a whole has been declared feasible with the percentage of 88,36 % with very good category.

Discussion about every aspect of Chemist web instructional media that assessed can be described as follows:

1. Construct Validity

Based on the results of the validation, Chemist web instructional media is feasible in terms of the construct validity with percentage of 85,33 % which is included in the category of very good. It shows that Chemist web instructional media is feasible of requirements in terms of construct validity. To clarify the results in terms of construct validity, it can be seen as follows:

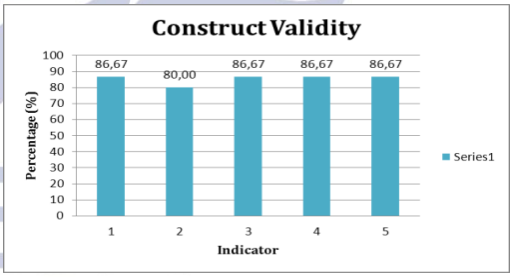

Figure 2. Graph Validation Results based on Construct Validity

Description:

1. Suitability media presentation of the matter in accordance applicable curriculum,
2. Suitability media presentation of the matter in accordance Core Competence (CC) and the Basic Competence (BC),
3. Suitability presentation of the matter in accordance with the learning objectives,
4. Suitability language used in web

5. Suitability of writing and the phrase in the web

Based on the graph shows that the poor results of Chemist web instructional media at second indicator with percentage of 80 % whereas the other indicators to get a percentage of 86,67%.

2. Content Validity

Based on the results of the validation, Chemist web instructional media is feasible in terms of content validity with percentage of 82,96 % which is included in the category of very good. It shows that Chemist web instructional media is feasible of requirements in terms of content validity. To clarify the results in terms of content validity, it can be seen as follows:

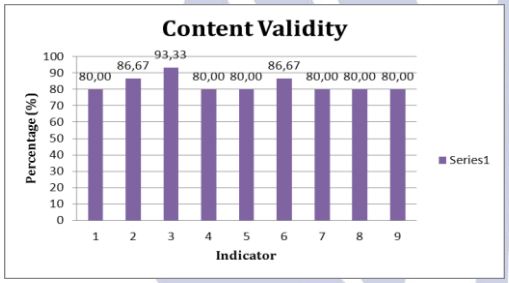

Figure 3. Graph Validation Results based on Content Validity

Description:

1. Concepts of hydrolysis that presented in the web is correct
2. Concepts of acid-base properties of salt solutions that presented in the web is correct.
3. Concepts hydrolysis calculations that presented in the web is correct.
4. Chemical terms that used in the web
5. Quality web design as an instructional media.
6. Font and font color on the web
7. Layout and grouping matter
8. Images that presented in web are relevant and appropriate with the matter
9. Video that presented in a web are relevant and appropriate to the matter

Based on the graph shows that the best results of Chemist web instructional media at third indicators with percentage of 93,33% about calculation of hydrolysis concept.

3. Empiric Validity

The empiric validity obtained in a limited test that obtained from the observation of student activity that supported by student learning outcomes and student responses. The empiric validity is to measure the legibility of students using Chemist web instructional media. With the percentage of 99,51% it can be said that Chemist web instructional media included in the category very good.

After Chemist web instructional media is feasible, the limited testing performed by 15 students of class XI Science 1 at Public Senior High School 2 Lamongan with randomly selected. Media needs to be tested to 10-20 students [12].

To know the students respond of Chemist web instructional media, students who have followed the limited test is given student questionnaire responses. Based on the results of the questionnaire as a whole stated the media is feasible with percentage of 89.33 %. Here's the result of student learning outcomes:

Table 6. Students learning outcomes

Aspect	Pretest	Postest
Average score	77,07	91,73
Classical thoroughness	66,67	93,33

Based on table 5, at the pretest time, there were 5 students who have not reached the value of 80 , so the classical thoroughness students only reached 66,67 % while at posttest , although all students to increase learning outcomes but still there is one student who has not completed, so classical thoroughness students reached 93,33 % .

Based on the results of limited testing, Chemist web instructional media can be used in the learning process because students can more understand the matter about salt hydrolysis with Chemist web instructional media with percentage of

80%. With the media that are qualified and used in learning process, students can easily understand the concepts that are abstract in order to improve student learning outcomes [13].

Conclusion

1. Chemist web instructional media that developed on salt hydrolysis matter is feasible to be used as a learning media based on construct validity, content validity, and empiric validity respectively of 85,33%; 82,96%.; and 99,51%.
2. Students respond of Chemist web instructional media indicates positive response with an average percentage of 89.33 % of any aspect.
3. Student learning outcomes using Chemist web instructional media have increased with the percentage of 93,33 % classical thoroughness.

Sugestion

Chemist web instructional media can be developed in other chemistry matters.

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